

Surface Water Monitoring Report

Sorrento Lactalis, Inc.

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1.0 INTRODUCTION

Sorrento Lactalis, Inc. (Sorrento) processes dairy products in its facility located in northeast Nampa, Idaho on the northeast corner of Star Road and Franklin Road (see Figure 1). Sorrento was issued a National Pollutant Discharge Elimination System (NPDES) permit by the U.S. Environmental Protection Agency (EPA) authorizing discharge of certain treated wastewaters into the Purdam Drain, which flows into Mason Creek and ultimately the Boise River. The permit became effective November 1, 2005 and is scheduled to expire October 31, 2010. In accordance with its permit conditions, Sorrento submitted an application dated April 29, 2010, requesting that EPA renew the permit.

Sorrento's NPDES permit requires monthly flow monitoring and quarterly sampling of surface water at locations upstream and downstream from its effluent outfall. It also requires submittal of a Surface Water Monitoring Report with Sorrento's application for permit renewal. In its letter dated May 5, 2010, noting receipt of Sorrento's application, EPA requested that surface monitoring results be submitted prior to permit expiration.

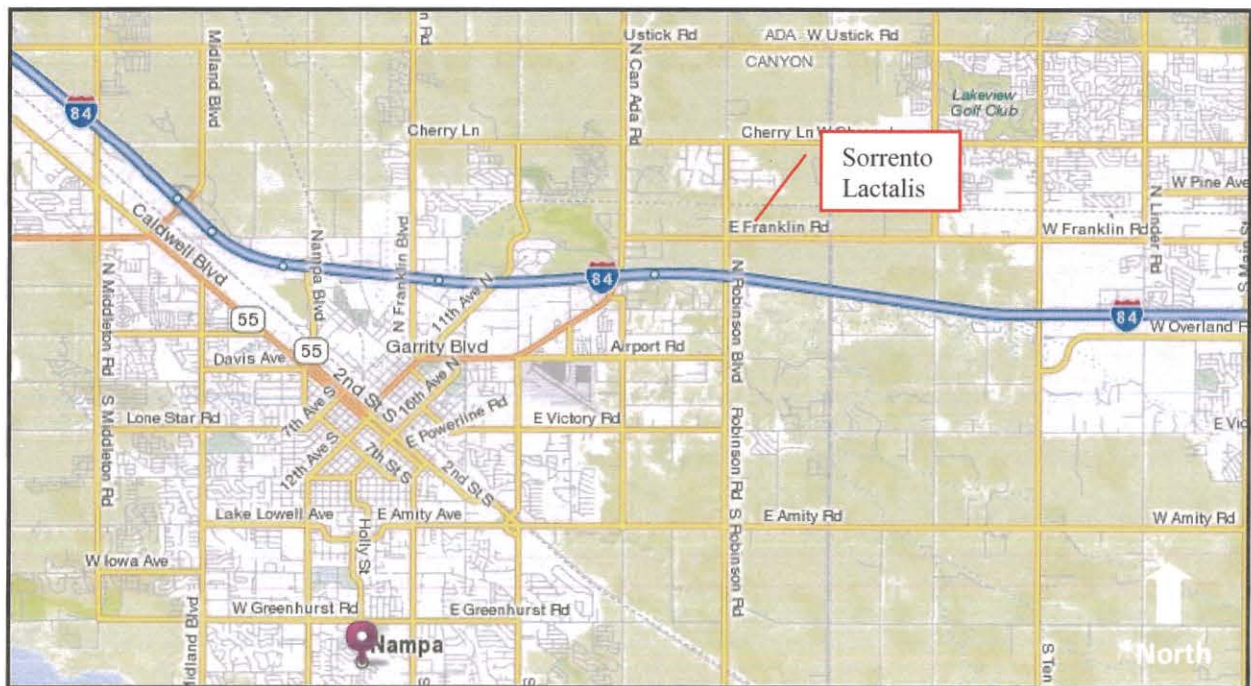


Figure 1 – Facility Location

The following report summarizes the results of Sorrento's surface water monitoring activity. The report also includes results from additional surface water sampling and analyses that Sorrento has undertaken to improve its understanding of water quality in the surrounding drains.

We ask that this information be included as part of our application packet for permit renewal.

1.1 Monitoring P

Monitoring requirements from Sorrento's NPDES permit are summarized in Table 1.

Table 1 – Surface Water Monitoring Requirements

Parameter	Units	Sample Location		Sample Frequency	Sample Type
		Upstream	Downstream		
Flow	mgd	•	•	Monthly	Measure
Nitrite	mg/L	•		Quarterly	Grab
Nitrate + Nitrite	mg/L	•		Quarterly	Grab
Total Kjeldahl Nitrogen	mg/L	•		Quarterly	Grab
Total Ammonia as N	mg/L	•	•	Quarterly	Grab
Total Phosphorous as P	mg/L	•	•	Quarterly	Grab
Orthophosphate as P	mg/L	•	•	Quarterly	Grab
pH	s.u.	•	•	Quarterly	Grab
Temperature	°C	•	•	Quarterly	Grab

1.2 Surface Water Sampling Locations

Sorrento's NPDES permit designates two surface monitoring locations on the Purdam Drain: one upstream of its effluent outfall and one far downstream of that outfall. The upstream sample location is immediately upstream of the outfall on the east side of Star Road. The second sample location is approximately 4½ miles downstream from the outfall and immediately south of the culvert where Purdam Drain crosses under Ustick Road. The permit refers to this location as the "mouth of Purdam Drain into Mason Creek" because the location is approximately 700 feet above the Purdam Drain's confluence with Mason Creek. (These surface water sampling locations are shown in Figure 2.)



Figure 2 – Surface Water Monitoring Locations

1.3 Sampling and Analysis

A brief description of Sorrento's surface water collection, preservation, and analysis procedures follows.

1.3.1 Sample Collection

Sorrento's laboratory technician collects grab samples at the upstream and downstream locations, generally within an hour of each other. The permit requires sampling of surface water only on a quarterly basis. However, in order to understand more fully the immediate region's overall surface water quality, Sorrento has undertaken a monthly sampling regime, typically on the same day wastewater effluent samples are collected.

Water samples are collected in polypropylene bottles that have been cleaned and provided by Analytical Laboratories, Inc. (ALI). Water samples are then transported to Sorrento's wastewater facility, where they are stored inside a refrigerator at 4°C until picked up by ALI and transported to its laboratory in Boise, Idaho. ALI generally picks up samples prior to 3 p.m. on the same day of collection. On those days in which ALI is unable to retrieve the samples within the same day of collection, Sorrento delivers the samples to the ALI laboratory.

1.3.2 Physical Parameters

In order to estimate flows at the upstream and downstream locations, Sorrento installed staff gauges adjacent to those locations in January 2006. Discharge rating curves were developed at both locations between January 2006 and June 2006. A “pygmy meter” was used to measure water velocity, a meter stick to measure water depth, and a cloth meter tape to determine channel width. Flow measurements were estimated each month based upon staff gauge readings and calculated from the corresponding rating curve readings.

Sorrento’s laboratory technician measures and records temperature and pH within a few minutes of sample collection using

- a NIST Traceable Certified Thermometer, manufactured by H-B Instrument Co. Catalog number 41100; and
- a HACH SensION gel filled pH electrode model 51935-00.

1.3.3 Sample Analysis

Analytical tests have been performed by Analytical Laboratories, Inc., a state-certified laboratory in Boise, Idaho. Analytical methods and minimum detection limits (MDLs) for a majority of the required procedures are shown in Table 2.

Table 2 – Analytical Detection Levels

Parameter	Maximum Minimum Level Req'd by Permit	Minimum Detection Limit*	Method*
	mg/L		
Nitrite	0.01	0.01	EPA 353.2
Nitrate + Nitrite	0.1	0.02	EPA 353.2
Total Kjeldahl Nitrogen	0.1	0.10	EPA 351.2
Total Ammonia as N	0.05	0.04	EPA 350.1
Total Phosphorous as P	0.01	0.005	EPA 365.1
Orthophosphate as P	0.01	0.005	EPA 365.1

* Minimum detection limits and test methods for a majority of required procedures

Over the period in which Sorrento’s NPDES permit has authorized discharge into Purdam Drain and surface water samples have been collected and analyzed, only three of the over 300 analytical results have been reported at values less than the MDLs. That is, in three instances, the MDL exceeded the required maximum minimum level specified by the permit. Each of those analyses was associated with January 22, 2008, samples. Both upstream and downstream samples were analyzed using the high level Total Phosphate analytical method instead of the low level Total Phosphate analytical method. It is unknown if the cause was a chain of custody error or laboratory error.

That same January 22, 2008, sample set was subjected to the appropriate procedure and MDL for Total Kjeldahl Nitrogen (TKN) from water collected upstream of the effluent outfall. Sorrento also analyzed its downstream samples for TKN, even though the analytical requirements for that sample location do not include TKN. It should be noted that the laboratory incorrectly reported

the MDL for the downstream sample as 1 milligram per liter (mg/L); that level is ten times greater than the typical MDL for that test method.

1.3.4 Quality Assurance, Quality Control (QA/QC)

Sorrento and ALI established a standardized chain of custody procedure for surface water monitoring. Those protocols are intended to reduce the risk of laboratory errors or that Sorrento might fail to perform a required surface water analytical test because of an improperly completed chain-of-custody forms.

During data analysis and preparation of this surface water monitoring report, Sorrento identified gaps in its analytical data set. The majority of those data gaps occurred during the first two years of operation of the wastewater treatment plant, i.e., the first two years following permit authorization. During that time Sorrento employed multiple wastewater treatment plant managers and the full suite of monitoring did not always occur.

Over the past three years, with the exception of testing for ammonia in the third quarter of 2008, all parameters have been collected and analyzed as required. Additionally, Sorrento initiated routine testing for TKN, nitrite, and nitrate + nitrite from the downstream monitoring location. This optional sampling is intended to highlight variances in upstream and downstream water sample analyses.

2.0 SURFACE WATER MONITORING RESULTS

This section summarizes the results of Sorrento's surface water monitoring program.

2.1 Flow Data and Analysis

Flow data for the Purdam Drain sample locations, from December, 2005 through August, 2010, are provided in Table 3 and shown graphically in Figure 3.

Table 3 – Purdam Drain Flow

Date	Flow (MGD)	
	Upstream Monitoring Location	Downstream Monitoring Location
December 30, 2005	9.89	17.89
January 26, 2006	6.05	34.14
February 14, 2006	5.40	44.82
March 20, 2006	4.35	31.06
April 18, 2006	9.12	45.59
May 19, 2006	18.76	36.73
June 21, 2006	21.35	22.33
July 28, 2006	26.65	10.48

Date	Flow (MGD)	
	Upstream Monitoring Location	Downstream Monitoring Location
August 29, 2006	39.22	10.48
September 29, 2006	34.73	13.17
October 31, 2006	16.16	13.17
November 30, 2006	6.32	5.75
December 21, 2006	7.00	32.54
January 10, 2007	5.36	29.24
February 10, 2007	5.36	34.05
March 26, 2007	3.34	43.93
April 15, 2007	3.34	32.17
May 1, 2007	16.16	25.71
June 1, 2007	13.47	12.89
July 12, 2007	25.91	11.27
August 16, 2007	37.39	10.48
September 9, 2007	33.87	9.97
October 12, 2007	20.39	6.62
November 16, 2007	7.18	7.77
December 6, 2007	5.36	18.48
January 16, 2008	5.83	36.35
February 19, 2008	4.91	38.30
March 12, 2008	2.38	40.68
April 22, 2008	6.83	46.01
May 15, 2008	15.60	34.05
June 16, 2008	33.02	21.34
July 20, 2008*	37.84	10.48
August 12, 2008	38.30	10.48
September 22, 2008	32.60	8.00
October 31, 2008	13.99	5.75
November 12, 2008	3.96	5.75
December 16, 2008	3.96	10.48
January 21, 2009	3.96	8.00
February 17, 2009	3.96	5.75
March 27, 2009	3.96	5.75
April 14, 2009	7.00	10.48
May 21, 2009	13.99	40.68
June 19, 2009	31.77	55.49
July 25, 2009	34.73	53.28
August 14, 2009	19.13	62.28
September 17, 2009	16.16	53.28
October 1, 2009	8.90	22.33
November 12, 2009	2.79	16.05
December 2, 2009	2.79	10.48
January 5, 2010	2.79	10.48
February 2, 2010	1.11	13.17
March 11, 2010	3.96	5.75
April 6, 2010	2.79	5.75

Date	Flow (MGD)	
	Upstream Monitoring Location	Downstream Monitoring Location
May 5, 2010	7.00	29.24
June 3, 2010	16.16	57.72
July 22, 2010	29.74	57.72
August 6, 2010	22.37	62.28

Downstream measurement taken on July 22, 2008

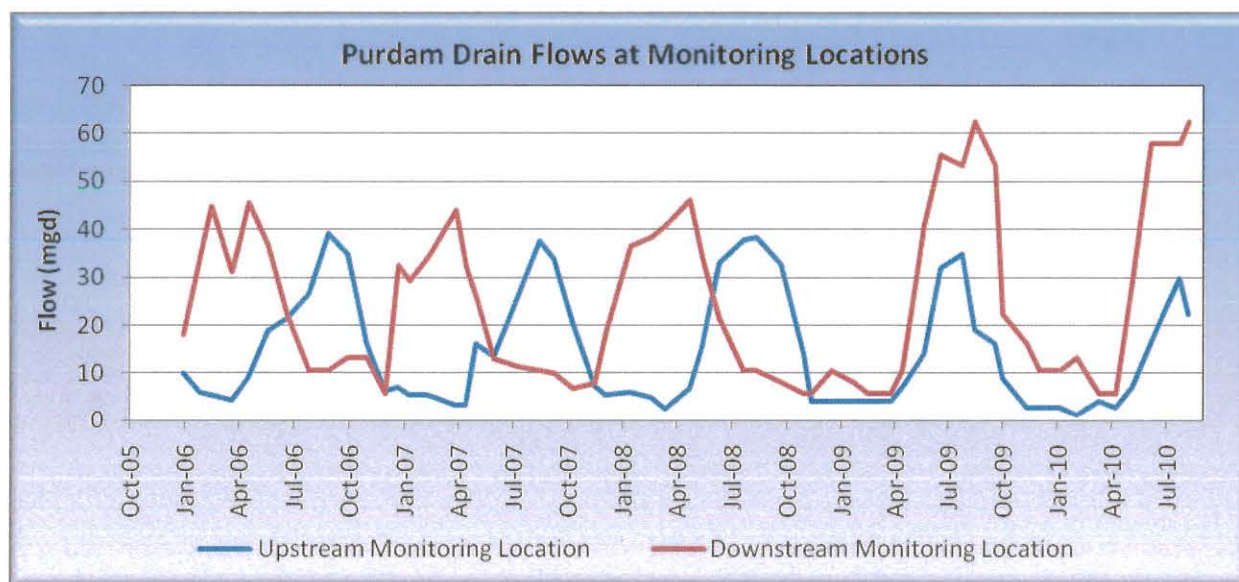


Figure 3 – Purdam Drain Flows at Monitoring Locations

Figure 3 suggests that the cyclical nature of flows at the upstream location (designated by the blue line) have been remarkably consistent throughout the monitoring period. Each year, peak flows generally have occurred in late summer and low flows have occurred in late winter. Maximum flows at this upstream location have been similarly consistent each year, generally ranging from 35-40 million gallons per day (MGD). Minimum flows were all less than 5 MGD.

Discharges at the downstream location were relatively consistent during 2006, 2007, and 2008 with maximum and minimum flows generally occurring during opposite times of the year compared to flows at the upstream location. That is, maximum flows generally occurred at the downstream location in late winter or early spring and minimum flows occurred in late summer or early fall.

In 2009, flows at the downstream location more closely mirrored flows at the upstream location. That is, maximum flows occurred in summer and minimum flows occurred in the winter. The limited nature of this data set make it impossible to conclude that a new trend is occurring but peaks in 2010 flow measurements through August also resemble those of the previous year. The reason(s) for this possible shift in flow regimes over the past 18 months is unknown.

However, the cyclical nature of differing maximum and minimum flows suggest that various factors influence the Purdam Drain between Sorrento's upstream and downstream monitoring locations. Extensive agricultural activity occurs in the 4½ miles between those two locations. Many of these agricultural operations are known to discharge irrigation water directly or indirectly to the Purdam Drain.

The quantity of water drawn from the Purdam Drain during summer periods is also unknown. Such practices could explain the reduction in flows between the upstream and downstream monitoring.

The impacts of the various drains on the upstream and downstream monitoring locations are unknown. For example, it is relevant to note that the confluence of the Perkins Drain and the Purdam Drain occurs approximately 800 feet downstream of Sorrento's outfall. Flows and constituent levels from the Perkins Drain are not monitored. Therefore potential impacts of the Perkins Drain on the Purdam Drain are largely unknown. Such external variables between Sorrento's outfall and the existing downstream monitoring location at Ustick Road and the mouth of Mason Creek, none of which are under the control of Sorrento, suggest that the designated downstream monitoring location does not reflect actual or potential impacts of that effluent on the Purdam Drain.

2.2 Nitrogen Species Data and Analysis

Quarterly analytical results for Sorrento's surface water monitoring program for nitrogen species, as required by its NPDES permit, are provided in Table 4. Occasionally, multiple samples have been collected and analyzed in a single quarter. For such months, the arithmetic mean of those analytical results was calculated and tabulated. No data have been omitted. Please refer to the Surface Water Monitoring Analytical Results sheet (see Appendix A) for dates on which samples were collected and the results of each analysis.

Table 4 – Summary of Surface Water Analytical Results for Nitrogen Species

Year	Quarter	Upstream Monitoring Location				Downstream Monitoring Location			
		NH ₃	NO ₃ + NO ₂	NO ₂	TKN	NH ₃	NO ₃ + NO ₂ *	NO ₂ *	TKN*
		(mg/L)				(mg/L)			
2006	Q1	<0.04	4.50	0.01	0.38	<0.04			
	Q2	0.05		0.06	0.60	<0.04		0.04	0.46
	Q3								
	Q4	<0.04	5.50	0.04	0.81	<0.04		0.03	0.51
2007	Q1	<0.04	4.20	0.02	0.20	<0.04			
	Q2		2.40	2.30	0.34		2.50	2.40	0.68
	Q3		3.80	2.10	0.33		2.50	1.70	0.37
	Q4								
2008	Q1	<0.04	4.33	2.05	0.27	<0.04	4.75	4.1	
	Q2	<0.04	1.50	0.02	0.36	<0.04			
	Q3	<0.04	1.85	0.01	0.26				
	Q4	<0.06	4.61	0.02	1.10	<0.04	4.57	0.02	0.76
2009	Q1	<0.04	4.72	0.01	0.56	<0.04	4.89	0.02	0.50
	Q2	<0.04	1.48	<0.01	0.34	<0.04	2.42	0.02	0.44
	Q3	<0.04	2.46	0.02	0.33	<0.04	2.44	0.03	0.49
	Q4	<0.10	3.23	0.02	0.49	<0.04	3.68	0.01	0.33
2010	Q1	<0.05	4.29	0.01	0.49	<0.04	5.08	0.01	0.41
	Q2	<0.06	2.47	0.02	0.36	<0.04	2.86	0.03	0.49
	Q3	<0.06	2.37	0.06	0.53	<0.05	2.45	0.05	0.66
Mean		<0.05	3.36	<0.40	0.46	<0.04	3.48	0.65	0.52
Median		<0.04	3.52	0.02	0.36	<0.04	2.86	0.03	0.49
Std Dev		0.016	1.286	0.837	0.224	0.003	1.130	1.289	0.142

General Note: Some concentrations in this table, identified in yellow cells, represent the mean results for samples collected during each quarter if more than one sample was collected and analyzed.

* Data not required by existing NPDES permit.

Ammonia

Ammonia concentrations in upstream and downstream water samples are depicted in Figure 4.

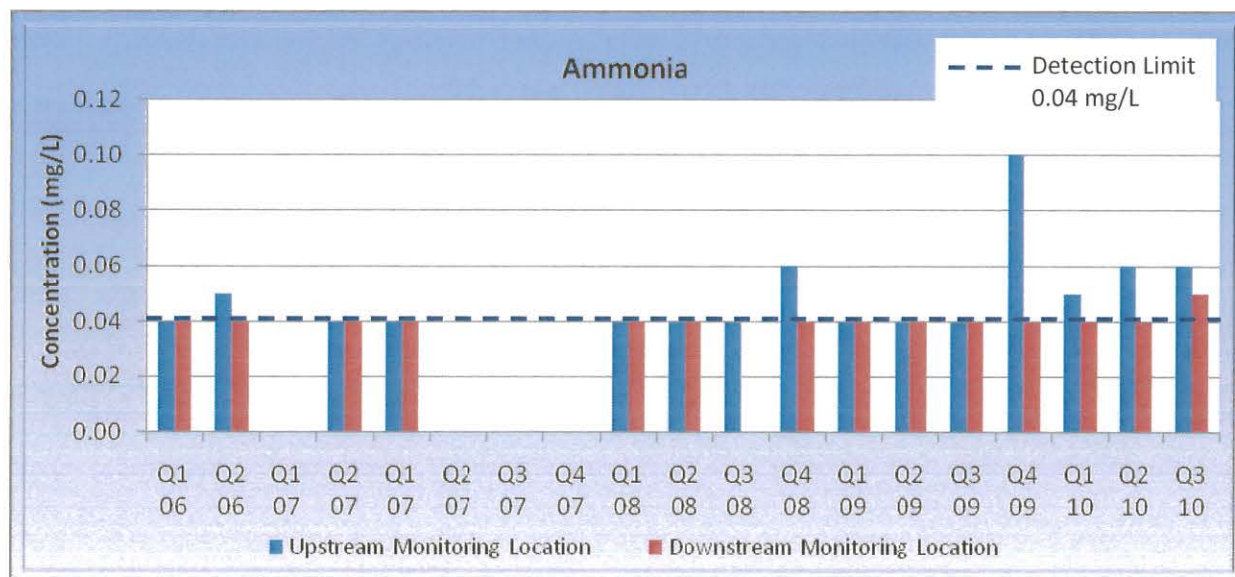


Figure 4 – Purdam Drain Ammonia Data

Ammonia concentrations were generally less than the MDL (0.04 mg/L) at both upstream and downstream sample locations over the 15 quarters for which samples were collected and analyzed. Ammonia concentrations in Sorrento's effluent seldom exceeded the MDL (see Permit renewal application and DMRs). As noted previously, the multiple sources of ammonia between the Sorrento outfall and the monitoring location serve to obfuscate any contributions of ammonia by Sorrento. We question the value of analyzing and reporting ammonia concentrations in the Purdam Drain and request that EPA eliminate this requirement from the list of required monitoring parameters in Sorrento's renewed permit.

Nitrate + Nitrite & Nitrite

Nitrate + nitrite and nitrite concentrations in upstream and downstream water samples are depicted in Figures 5 and 6.

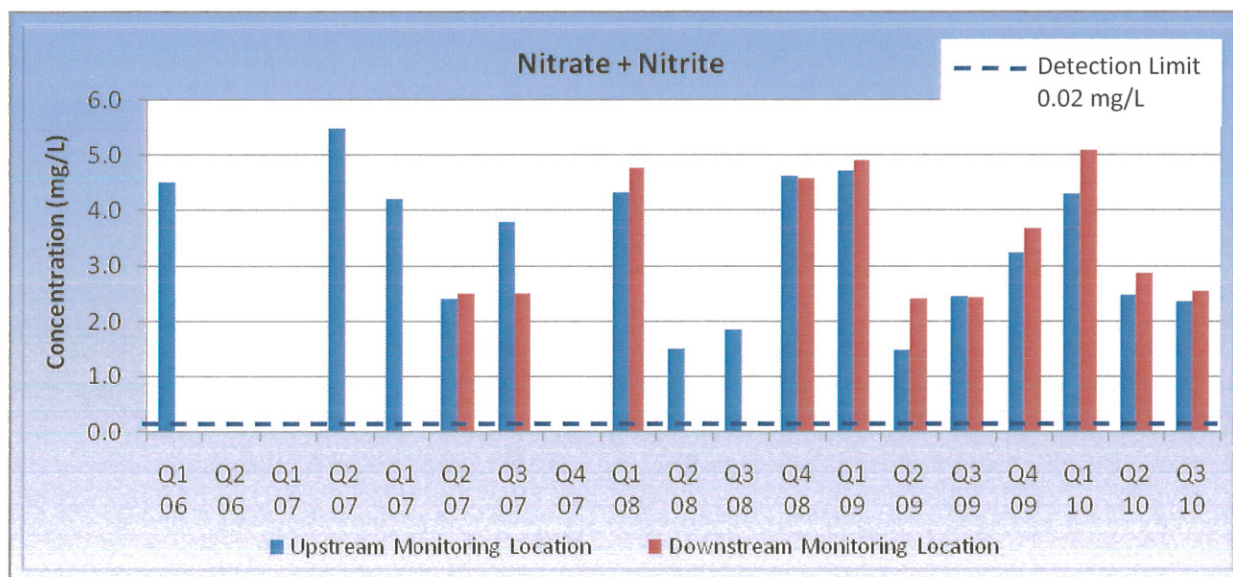


Figure 5 – Purdam Drain Nitrate + Nitrite Data

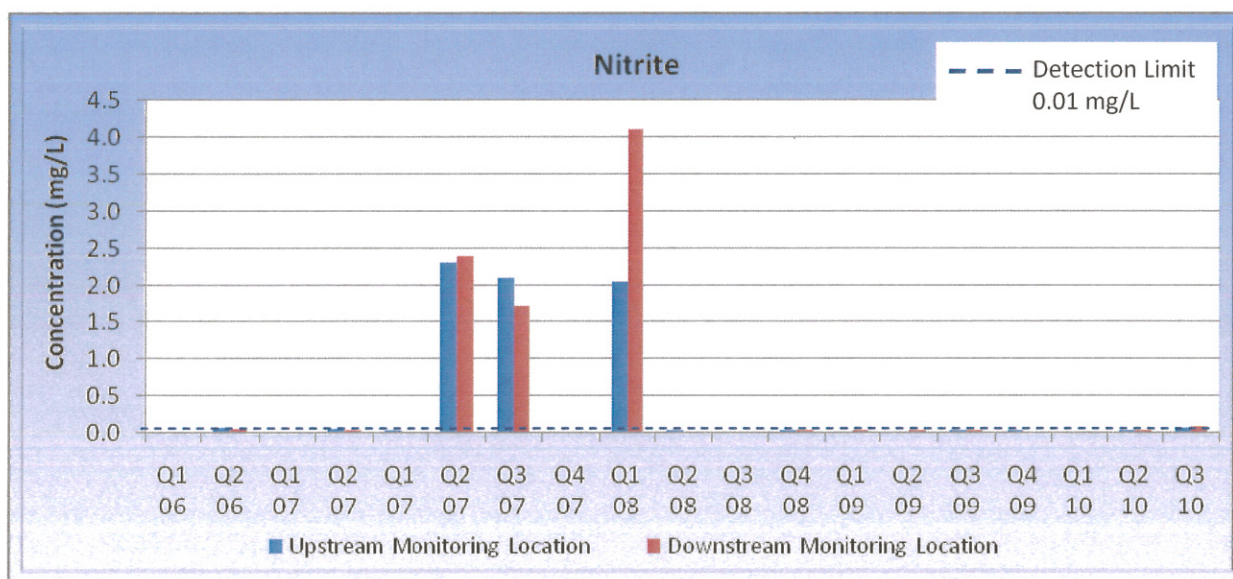


Figure 6 – Purdam Drain Nitrite Data

The concentrations of the inorganic forms of nitrogen tested (ammonia, nitrate, and nitrite) were generally similar in samples collected from both upstream and downstream locations for each collection period. The low ammonia and nitrite concentrations (with the exception of three nitrite samples in 2007Q2, 2007Q3, and 2008Q1) suggest that the majority of inorganic nitrogen present in the Purdam drain is in the form of nitrate. Although it cannot be readily deduced from Figure 6 (due to the scale of the Y-axis), nitrite concentrations were generally only slightly above detection limits. This resultant predominance of nitrate is consistent with the high amount of agricultural activity in the area.

Because of the demonstrated predominance of nitrate and the extremely short-life of nitrite in oxygenated surface waters, Sorrento believes that a requirement to monitor for nitrite provides

questionable benefit in assessing any potential impact of Sorrento's effluent on surface water quality. We request that EPA eliminate this requirement from the list of required monitoring parameters in Sorrento's renewed permit.

Total Kjeldahl Nitrogen

Total Kjeldahl Nitrogen (TKN) concentrations in upstream and downstream water samples are depicted in Figure 7.

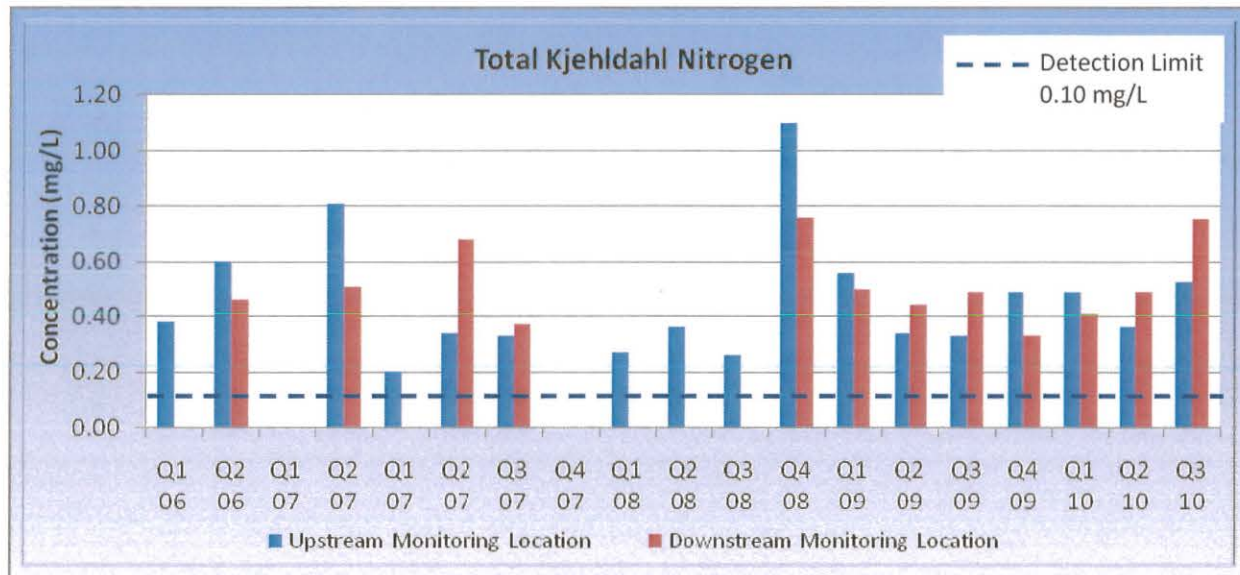


Figure 7 – Purdam Drain TKN Data

TKN represents the combination of organically-bound nitrogen and ammonia. As shown in Figure 4, ammonia concentrations over the full period of monitoring were generally equal to or less than 0.04 mg/L. Thus, upstream and downstream TKN concentrations generally consist of low levels of organically-bound nitrogen and a larger component of ammonia. The variability in the data does not support a conclusion as to the actual or potential impacts of Sorrento's effluent on surface water quality.

2.3 Phosphate Species, Temperature, and pH Data and Analysis

A summary of quarterly analytical results of Sorrento's surface water monitoring program for two phosphate species, temperature, and pH is provided in Table 5. Occasionally, multiple samples have been collected and analyzed in a single quarter. For such months, an arithmetic mean of those analytical results was calculated and tabulated. No data have been omitted. Please refer to the Surface Water Monitoring Analytical Results sheet (see Appendix A) for dates on which samples were collected and the results of each analysis.

Table 5 – Summary of Surface Water Analytical Results for Phosphate Species, pH, and Temperature

Year	Quarter	Upstream Monitoring Location				Downstream Monitoring Location			
		O-P	TP	pH	Temp	O-P	TP	pH	Temp
		(mg/L)	(mg/L)	(s.u.)	(°C)	(mg/L)	(mg/L)	(s.u.)	(°C)
2006	Q1	0.20	0.22	8.6	10	0.20	0.25	8.7	10
	Q2	0.20	0.21			0.22	0.26		
	Q3								
	Q4	0.27	0.38	7.5	15	0.10	0.16	7.6	14.3
2007	Q1	0.08	0.25	8.05	13.5	0.38	0.39		
	Q2	0.20	0.20			0.26	0.34		
	Q3	0.17	0.22			0.21	0.24		
	Q4								
2008	Q1	0.22	<0.37	7.5	3*	0.21	<0.41	7.5	2*
	Q2	0.16	0.17			0.24	0.37		
	Q3	0.14	0.20				0.33	7.4	8.1*
	Q4	0.21	0.42	7.6	14.2*	0.23	0.31	7.8	6.0*
2009	Q1	0.182	0.291	7.8	6.1*	0.224	0.263	7.3	6.5*
	Q2	0.085	0.173	7.5	2.4*	0.156	0.291	8.0	4.5*
	Q3	0.148	0.188	7.3	5.9*	0.198	0.320	7.9	13.0*
	Q4	0.222	0.255	8.3	1.3*	0.238	0.239	7.7	10.4*
2010	Q1	0.209	0.305	7.9	10.0	0.217	0.265	7.9	11.7
	Q2	0.125	0.172	7.9	16.5	0.174	0.235	7.9	13.3
	Q3	0.176	0.253	7.5	18.0	0.178	0.331	7.7	17.5
Mean		0.176	<0.252	7.8	9.7*	0.215	<0.294	7.7	9.8*
Median		0.182	0.220	7.7	10.0*	0.214	0.291	7.8	10.2*
Std Dev		0.050	0.077	0.387	5.833*	0.058	0.064	0.42	4.50*

General Note: Some concentrations in this table, identified in yellow cells, represent the mean results for samples collected during each quarter if more than one sample was collected.

* Data not reliable. The same Hach bench-top temperature/pH probe that had provided inaccurate effluent temperature readings prior to Nov 2009 had also been used for surface water temperatures

Ortho-Phosphate and Total Phosphorus

Ortho-phosphate (O-PO₄) and total phosphorus (TP) concentrations in upstream and downstream water samples are depicted in Figure 8 and 9.

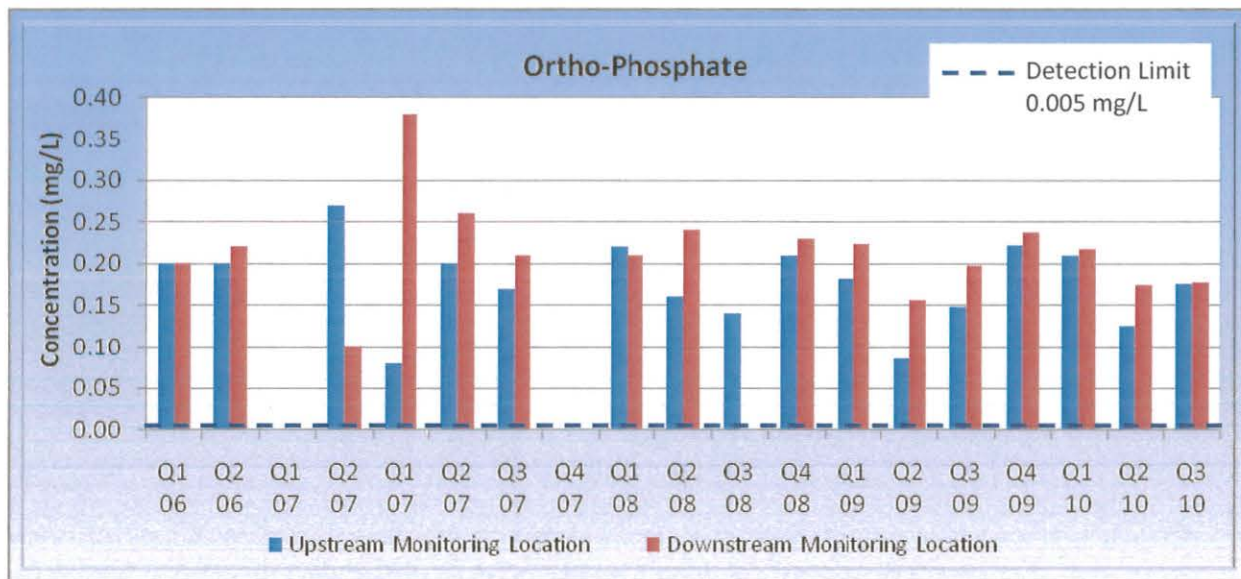


Figure 8 – Purdam Drain Ortho-Phosphate Data

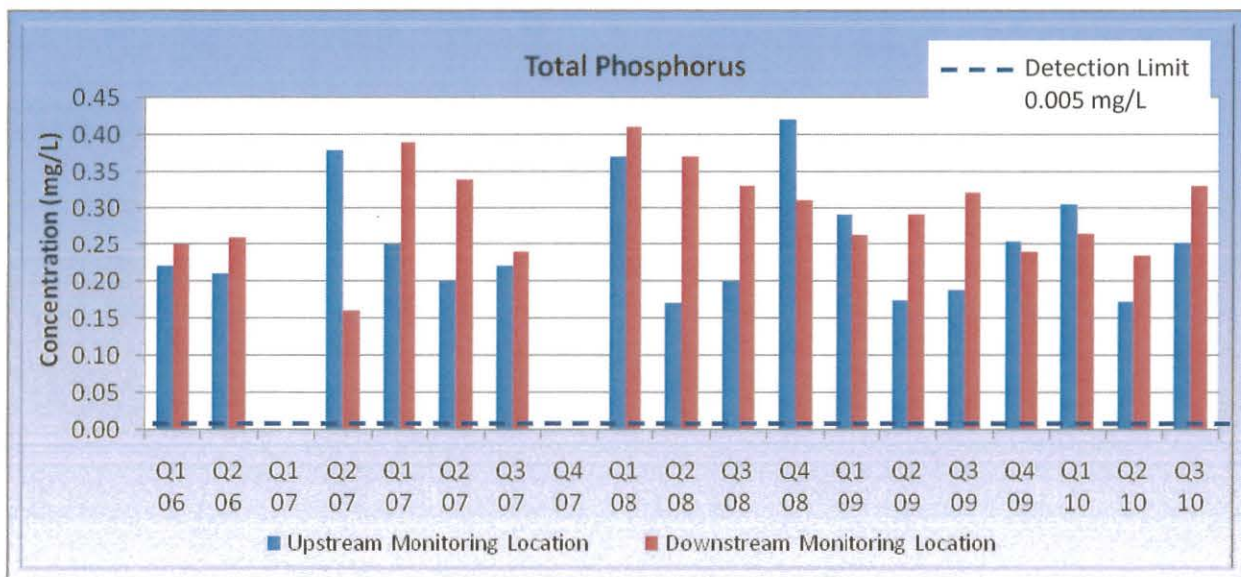


Figure 9 – Purdam Drain Total Phosphorus Data

Table 5 and Figures 8 and 9 generally suggest a slight increase in TP and O-PO₄ at the downstream monitoring location compared to the upstream monitoring location over the period of Sorrento's surface water sampling effort. That difference in TP between the two locations ranged from a decrease of 0.24 mg/L to an increase of 0.15 mg/L; the downstream location showed an arithmetic mean increase of 0.01 mg/L total phosphorus compared to the upstream location. Similarly, the difference in O-PO₄ between the two locations ranged from a decrease of 0.14 mg/L to an increase of 0.30 mg/L; the downstream location showed an arithmetic mean increase of 0.04 mg/L ortho-phosphate compared to the upstream location.

Again, it is relevant to note that the downstream monitoring station ("mouth of Purdam Drain into Mason Creek") is located approximately 4½ miles downstream of Sorrento's outfall. Many

variables, not associated with Sorrento's operations, could contribute to an apparent increase in phosphorus at the downstream location, such as runoff from agricultural operations. We believe that these phosphorus data further suggest that the existing downstream monitoring location is not appropriate to assess actual or potential impacts associated with Sorrento's treated effluent.

We further evaluated these surface water monitoring data to improve our understanding of the relationship between ortho-phosphate and total phosphorus in the upstream and downstream surface water locations. Ortho-phosphate and total phosphorus concentrations at the upstream location are shown in Figure 10 and at the downstream location in Figure 11.

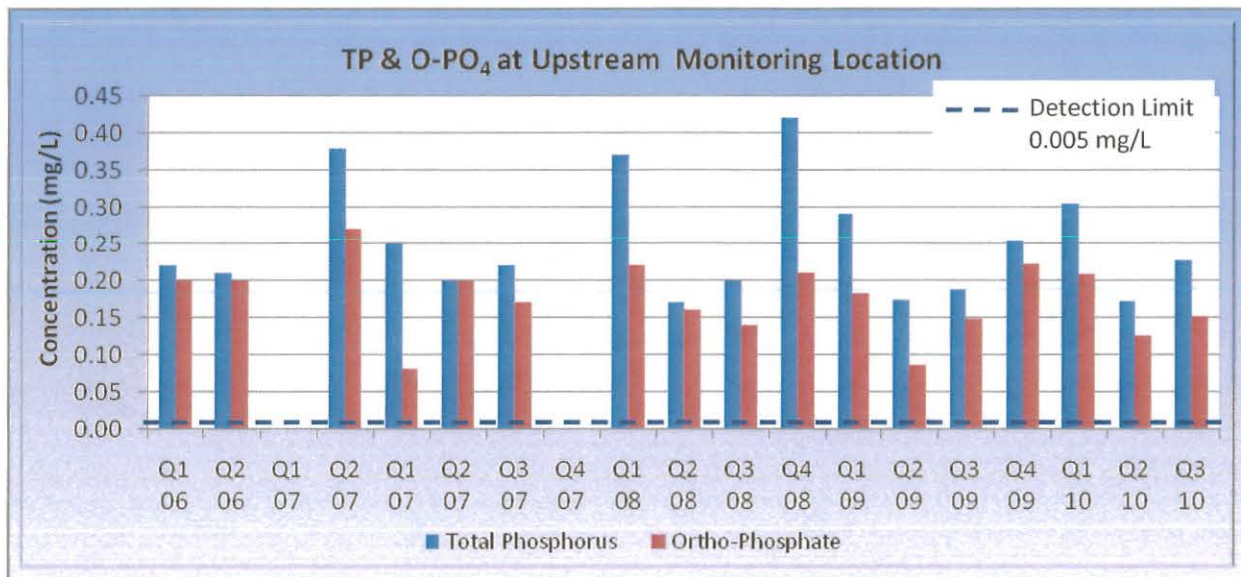


Figure 10 – TP and O-PO₄ Comparison at Purdam Drain Upstream Monitoring Location

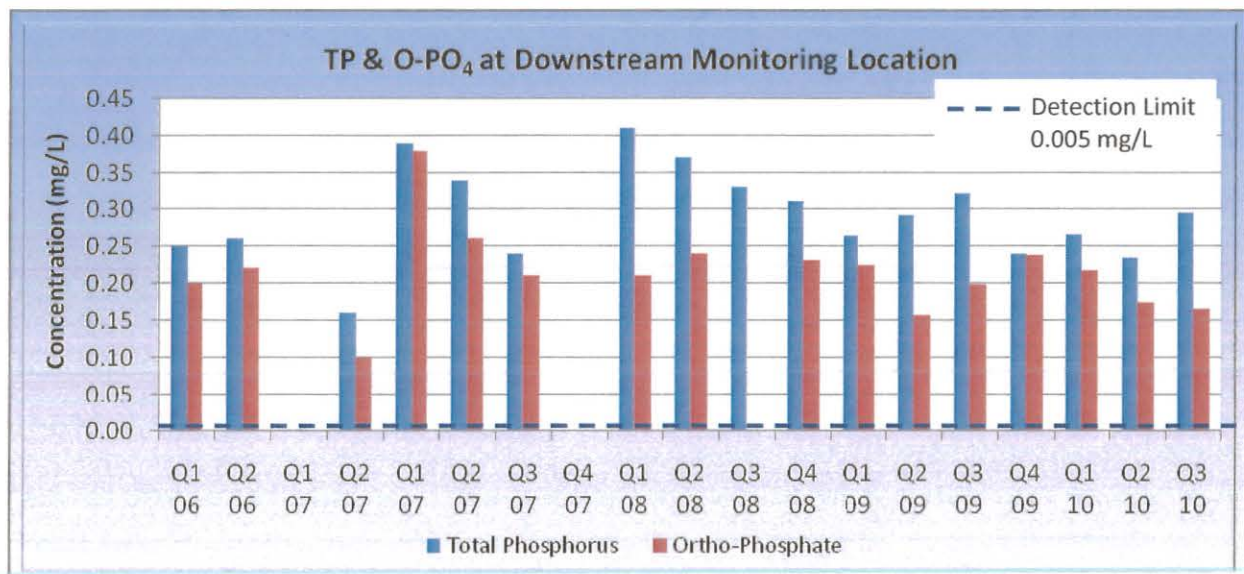


Figure 11 – TP and O-PO₄ Comparison at Purdam Drain Downstream Monitoring Location

These data indicate that ortho-phosphate has comprised from 32% to 100% of total phosphorus over the last 17 quarters of data at the upstream location and 51% to 100% of total phosphorus over the last 16 quarters at the downstream location. Over those periods, the arithmetic mean concentration of ortho-phosphate comprised 71% of total phosphorus in the upstream samples and 75% of total phosphorus in the downstream samples. The variability in these data is to be expected in as much as ortho-phosphate is the chemically active dissolved form of phosphorus that can be readily assimilated by plants. In-stream variations can be impacted by such variables as temperature, sunlight, plant biomass, and pH.

3.0 OPTIONAL BACKGROUND SURFACE WATER MONITORING

Prior sections of this report have noted numerous potential sources of constituents of concern to the Purdam Drain. Sorrento initiated additional surface water sampling in order to define better the existing background water quality and the implications of potential water quality impacts associated with discharges of treated effluent from Sorrento's operations. Sampling started at the end of May 2010, prior to the start of the irrigation season, and continued monthly through the summer of 2010. Samples were collected and analyzed on five separate occasions.

3.1 Sampling and Analysis Plan

A Sampling and Analysis Plan was prepared in March, 2010. It is included in the March 24, 2010 letter in Appendix B of this report and is summarized below.

3.1.1 Monitoring Locations

Additional surface water monitoring was undertaken at four locations (in addition to the two locations required by Sorrento's NPDES permit). The locations are described in Table 6 and indicated on an aerial photograph (see Figure 12).

Table 6 – Background Drain Sampling Locations

Monitoring Station	Description	Sampling Location
SW-A	Background - Perkins Drain	Perkins Drain downstream of McDermott Rd.
SW-B	Background - Rachael Drain	Rachael Drain downstream of Franklin Dr.
SW-C	Perkins Drain downstream of Rachael Drain confluence	Perkins Drain approximately 50-ft downstream of Perkins/Rachael confluence
SW-D	Purdam drain downstream of Perkins confluence	Purdam drain approximately 50-ft downstream of Perkins/Rachael confluence
SW-E (current sample pt)	Purdam Drain upstream of outfall	Perkins Drain upstream of Star Rd.
SW-F (current sample pt)	Effluent outfall	Existing effluent outfall sampling location at the wastewater treatment plant

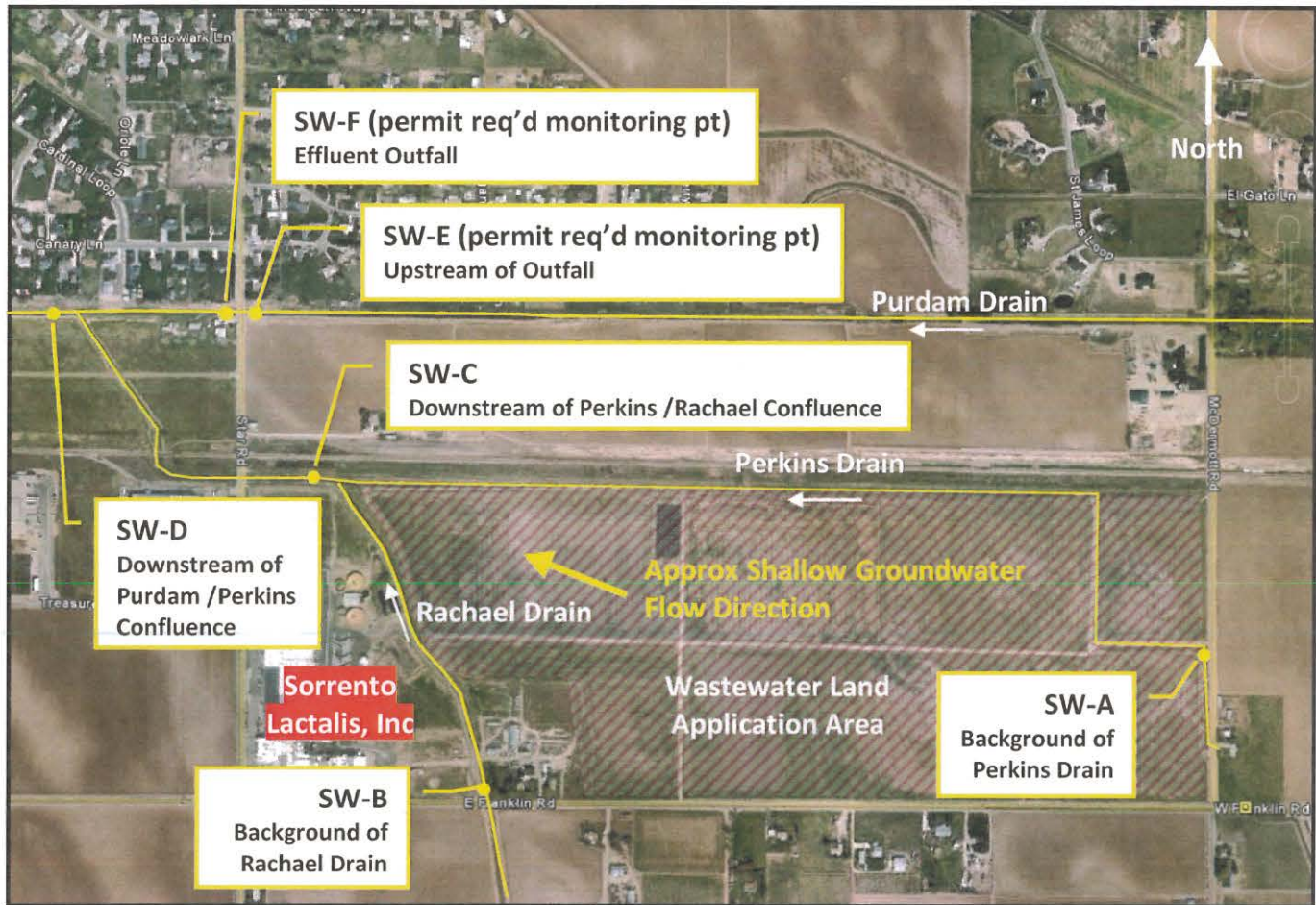


Figure 12 – Background Surface Water Monitoring Locations

Monitoring locations SW-A & SW-B were selected in order to provide an assessment of background water quality data upgradient of Sorrento's land application area and other undocumented lands uses. Monitoring location SW-C is intended to provide data below the convergence of the Perkins and Rachel drains. The difference between background (SW-A + SW-B) and monitoring location SW-C reflects potential impacts of groundwater that may have been impacted by land application and other land uses, i.e., (SW-A + SW-B) – SW-C.

Monitoring location SW-D on the Purdam Drain was selected to provide an insight into water quality data downstream of both Sorrento's outfall and the Perkins Drain. Those data, coupled with background (monitoring stations SW-C & SW-E), help to define potential water quality impacts of Sorrento's effluent on Purdam Drain water quality. Therefore,

$$\text{Surface Water Impacts} = \text{SW-D} - (\text{SW-C} + \text{SW-E} + \text{SW-F})$$

The downstream monitoring location required by the NPDES permit, i.e., mouth of Purdam Drain into Mason Creek, was also monitored.

3.1.2 Sample Collection and Flow Measuring Procedures

Grab samples were collected at each of the six locations in polypropylene bottles supplied by Analytical Laboratories, Inc (ALI). Following collection, samples were stored in a cooler with ice packets, also supplied by ALI, and transported to the laboratory for analysis. Following collection of each water sample, the cross-sectional area of each sample location was determined using a cloth tape for width and a meter stick to determine depths. Water velocity was measured using a hand-held propeller meter supplied by ALI. Water discharge at each location was calculated from the resultant measurements.

3.1.3 Analytical Parameters

Water samples from each monitoring location were analyzed for the following parameters: flow, total phosphorus, ortho-phosphate, nitrate-N, and Total Dissolved Solids (TDS). Total phosphorus and ortho-phosphate were analyzed because of their importance to the renewal of Sorrento's NPDES permit; nitrate and TDS are important parameters associated with reuse/land application permitting.

3.2 Parameter Concentrations

Table 7 summarizes mean water quality concentrations for these background drain locations. Individual data for each of the five sampling periods are provided in Appendix C.

Table 7 – Additional Drain Monitoring Summary

Monitoring Location	Flow (MGD) Low/High	Arithmetic Mean Concentration (mg/L)			
		Total Phosphate	Ortho-Phosphate	Nitrate	Total Dissolved Solids
SW-A	0.21/2.13	0.19	0.19	4.20	248
SW-B	1.69/6.01	0.15	0.11	2.74	200
SW-C	2.22/10.89	0.15	0.15	3.14	266
SW-D	7.39/34.30	0.18	0.16	3.36	317
SW-E (existing sample pt)	3.96/32.92	0.17	0.16	2.52	204
SW-F – Effluent (existing sample pt)	0.51/0.69	<0.04	<0.02	3.78	2,266

These data suggest, as hypothesized, that Sorrento's impacts on surface water quality are highly variable and subject to external sources beyond the company's control. For example, background concentrations of TP, O-PO₄, and nitrate in the Perkins Drain (SW-A) exceed those from Sorrento's outfall. Rachael Drain background concentrations of TP and O-PO₄ also exceed those from the outfall, while slightly less than the outfall for nitrate concentrations. Nutrient data from the remaining background monitoring station, Purdam Drain (SW-E), are consistent with those from Perkins and Rachael drains. Each of these background locations exhibited nutrient concentrations far in excess of those from the outfall. It is also interesting that background concentrations of nutrients for the Perkins Drain are significantly greater than those associated with the Rachael Drain and the Purdam Drain.

These data further suggest that total phosphorus is primarily comprised of ortho-phosphate (73%-100%) in the Perkins, Rachael, and Purdam Drains and roughly 50% in Sorrento's wastewater effluent.

3.3 Total Phosphorus Mass Loading

Optional surface water monitoring was performed by Sorrento to improve our understanding of the mass of total phosphorus already in the irrigation drains irrespective of Sorrento's contributions. Total phosphorus loadings upstream of Sorrento's effluent outfall (SW-E) ranged from approximately 8 pounds per day (lbs/day) during winter months (prior to the irrigation season) to greater than 50 lbs/day during the irrigation season when drain flows are greater.

TP entering the Purdam drain directly downstream of Sorrento's outfall is represented by monitoring location SW-C, which is the sum of TP loading from SW-A (Perkins Drain) and SW-B (Rachael Drain). Over the course of this limited study, these waters added approximately 3 lbs/day to 13 lbs/day additional total phosphorus into the Purdam Drain. Additional inputs to the Purdam Drain downstream from the Perkins Drain are unknown. Table 8 summarizes the loading of TP at each monitoring location for the five dates in 2010 on which water samples were collected and analyzed.

Table 8 – Optional Drain Monitoring - Total Phosphorus Loading

Monitoring Location	Total Phosphorus Loading (lbs/day)				
	March 30, 2010	April 2, 2010	May 6, 2010	June 3, 2010	July 6, 2010
SW-A	0.71	0.68	0.36	0.94	3.62
SW-B	2.68	3.24	1.97	9.52	5.51
SW-C	3.86	2.97	4.80	9.45	13.08
SW-D	11.10	12.78	22.95	44.71	52.60
SW-E (existing sample pt upstream of outfall)	8.25	7.26	9.65	27.45	43.92
SW-F – Sorrento Effluent (existing sample pt)	<0.29 ^a	<0.29 ^a	0.123	0.149	0.162

Figure 13 depicts the relative loadings of TP identified at each monitoring location on July 6, 2010, with the exception of the existing downstream monitoring site at the mouth of Mason Creek. Water quality and flow data were collected and determined at that monitoring location on July 22, 2010, as a part of Sorrento's routine surface water monitoring program.

The area of each bubble in Figure 13 is proportional to the mass of TP at that monitoring location. Of particular note is the dramatic increase in TP mass between SW-D and the downstream location required by Sorrento's NPDES permit, which is 4 ½ miles downstream. In this instance, total phosphorus loading increased from 53 lbs/day to 142 lbs/day, a 268%

increase. As Figure 13 shows pictorially, total phosphorus loading at every other sampled location is far greater than the total phosphorus released by Sorrento at its outfall (SW-F).

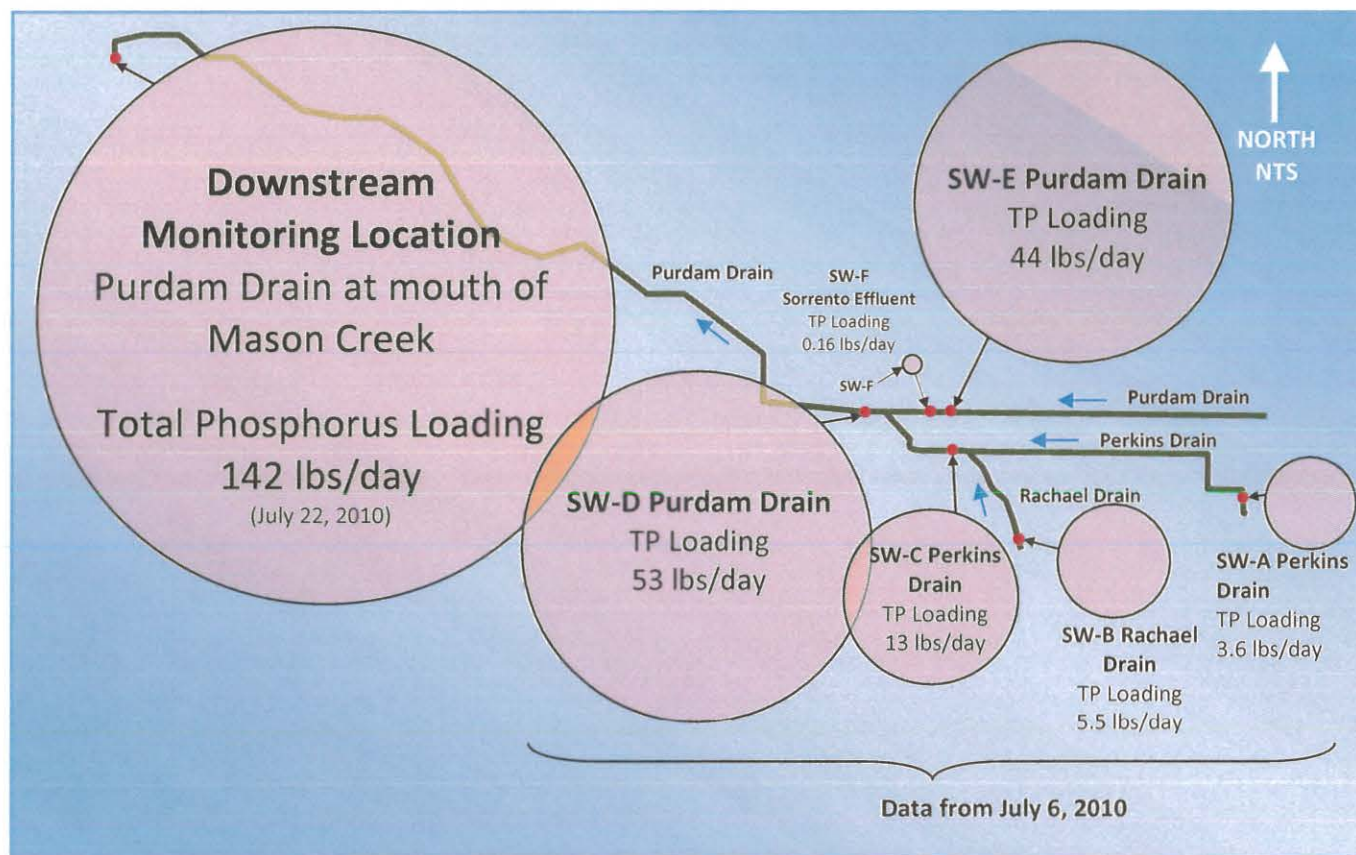


Figure 13 – Schematic of Relative TP Loading in Drains and Sorrento Effluent

As shown in Table 5, total phosphorus concentrations at upstream and downstream locations have remained relatively consistent throughout the year. Therefore, the greatest TP mass loading occurs during periods of high flows. Bubble schematics for total phosphorus loadings on May 6, 2010, and June 3, 2010 would be similar to that of Figure 13. Each of those dates coincided with the higher flows of the irrigation season.

Total phosphorus loadings prior to irrigation season (March 3 and April 2, 2010) showed relatively consistent loadings between SW-D and the downstream monitoring location. Figure 14 depicts the increase in total phosphorus loading between SW-D and the downstream monitoring location calculated for each date.

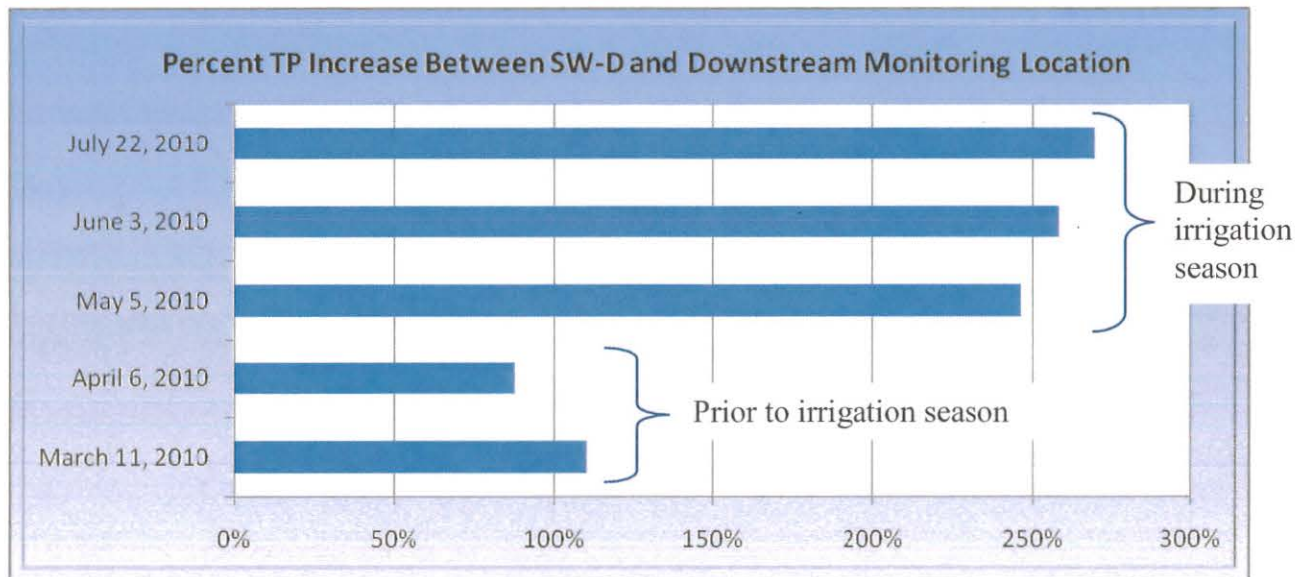


Figure 14 – Percent Total Phosphorus Increase Between SW-D and the Downstream Monitoring Location

The 247%-268% increase in TP mass between May and July from SW-D to the designated downstream monitoring location suggests that undefined influences affect water quality in the drain that cannot be reasonably attributed to Sorrento. Approximately 700 to 900 acres of agricultural land are estimated to drain into the Purdam Drain between Sorrento's effluent outfall and the downstream monitoring location. Those lands may significantly impact flows and constituent concentrations in Purdam Drain.

The impacts of other drains on the water quality of Purdam Drain are also unknown. We believe that this limited surface water study helps to highlight the impacts of unknown sources of total phosphorus on the Purdam Drain. The study also suggests that EPA should reconsider the location of Sorrento's existing downstream monitoring station.

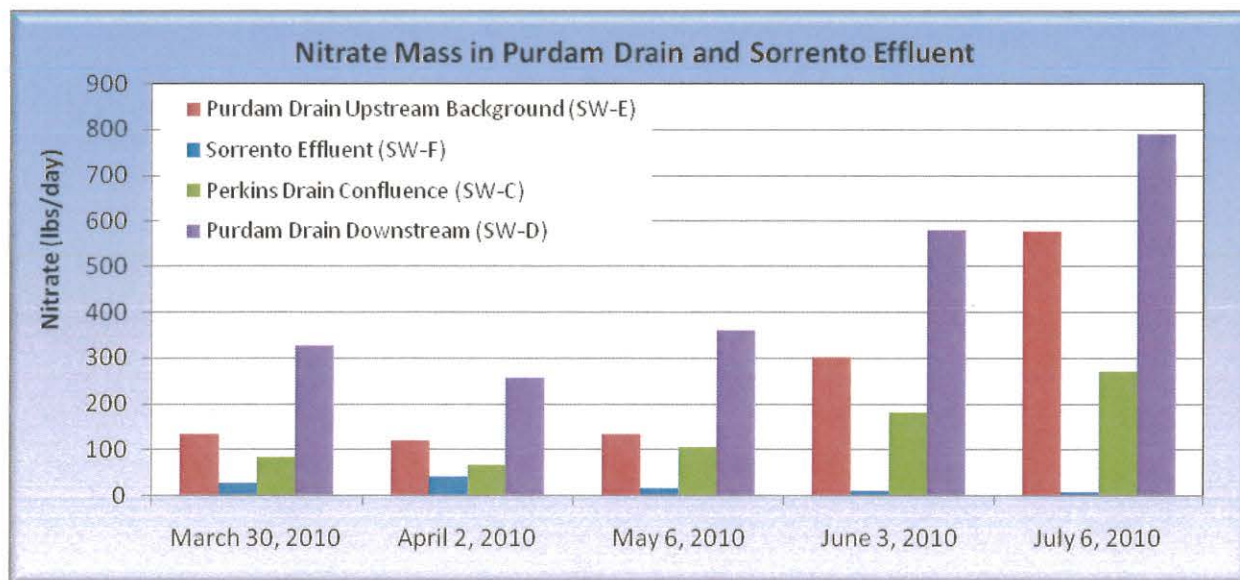
3.4 Nitrate Loading

Sorrento's optional surface water monitoring program also aids in understanding the mass of nitrate in irrigation drains upstream and immediately downstream of its outfall. Table 9 depicts the nitrate mass from each monitoring location for the five dates in 2010 on which samples were collected and analyzed.

Table 9 – Additional Drain Monitoring - Nitrate Mass

Monitoring Location	Nitrate Loading (lbs/day)				
	March 30, 2010	April 2, 2010	May 6, 2010	June 3, 2010	July 6, 2010
SW-A	16.6	18.0	8.4	29.5	52.3
SW-B	67.8	64.9	39.3	75.2	120.3
SW-C	81.7	64.9	104.7	181.7	268.8
SW-D	326.8	255.6	358.6	578.6	789.0
SW-E (existing sample pt)	132.0	118.8	133.6	302.0	576.5
SW-F – Sorrento Effluent (existing sample pt)	27.9	40.1	15.7	9.8	6.4

Figure 15 depicts nitrate loading on each sample date in the Purdam and Perkins drains, upstream and downstream of Sorrento's outfall.

**Figure 15 – Nitrate Loading in Drains and Sorrento Effluent**

These data suggest that nitrate loadings from the Purdam Drain (SW-E) and Perkins Drain (SW-C) accounted for a majority of nitrate in the Purdam Drain (SW-D) downstream of Sorrento's outfall. This is consistent with the previous hypothesis that extensive agricultural land and associated impacts upstream of Sorrento's outfall mask any actual and potential contributions from its treated effluent.

4.0 CONCLUSIONS AND RECOMMENDATIONS

These surface water data suggest that Sorrento's impacts on water quality in the Purdam Drain and downstream waterways are limited. Arithmetic mean total phosphorus concentrations at the upstream monitoring location were <0.25 mg/L based on 17 quarters of data. That is, background

concentrations of total phosphorus in the Purdam Drain were, on average, 3.6 times greater than Sorrento's permit limit (0.07 mg/L).

Sorrento is aware that the Idaho Department of Environmental Quality (DEQ) has drafted an Antidegradation Implementation Procedures rule, which, if adopted by the DEQ Board of Environmental Quality, will be reviewed by the 2011 Idaho Legislature. The draft antidegradation rule requires DEQ to evaluate effects on water quality for each parameter of concern and to determine whether an activity or discharge results in an improvement, no change, or degradation of water quality. The pending rule also specifies that water quality effects will be based on the calculated change in concentration in the receiving water as a result of a new or reissued permit. Because background concentrations of total phosphorus have ranged from two to six times greater than that in Sorrento's effluent, we anticipate that DEQ will determine that the Sorrento's existing total phosphorus effluent limit does not degrade water quality.

Sorrento recommends that its renewed NPDES permit maintain the current TP concentration limit of 0.07 mg/L. In order to accommodate planned and potential plant growth, we further request that the mass-based limit be based on an average monthly wastewater flow of 1.8 MGD. That flow would increase Sorrento's TP mass loading limit to 1.05 lbs/day. That loading represents less than 1% of TP mass in the Purdam Drain at the mouth of Mason Creek during peak flow periods. Sorrento also recommends that EPA adopt a seasonal total phosphorus effluent limit for Sorrento's renewed permit similar to their limit issued to the City of Kuna, Idaho.

Finally, Sorrento recommends that EPA designate a new downstream surface water monitoring location that better reflects the actual and potential impacts of its effluent. We recommend a location a few hundred yards downstream of Sorrento's outfall at the location designated as SW-D in our study. The location is on public land and zoned "U" for university. Another location that would be better than the current downstream surface water monitoring location is approximately 1-¼ miles downstream of the outfall at the crossing of Can-Ada Road near Cherry Lane.

APPENDIX A
Surface Water Monitoring
Analytical Results

Sorrento Lactalis, Inc.
Surface Water Monitoring
Analytical Results

Date	Upstream Monitoring Location								Downstream Monitoring Location							
	NH ₃ direct (as N)	NO ₃ ⁺ NO ₂ (as N)	NO ₂ (as N)	TKN	O-PO ₄ (as P)	T-P (as P)	pH	Temp ^b	NH ₃ direct (as N)	NO ₃ ⁺ NO ₂ ^a (as N)	NO ₂ ^a (as N)	TKN ^a	O-PO ₄ (as P)	T-P (as P)	pH	Temp ^b
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(s.u.)	Deg C	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(s.u.)	Deg C
3/15/2006	<0.04	4.50	0.01	0.38	0.20	0.22	8.6	10	<0.04				0.20	0.25	8.7	10
6/26/2006	0.05		0.06	0.60	0.20	0.21			<0.04		0.04	0.46	0.22	0.26		
11/30/2006															7.7	13.6
12/14/2006	0.04	5.50	0.05	0.53	0.31	0.36	7.5	15							7.5	15
12/21/2006															7.7	
12/29/2006	<0.04		0.03	1.09	0.22	0.40			<0.04		0.03	0.51	0.10	0.16		
3/29/2007	<0.04	4.20	0.02	0.20	0.08	0.25	8.05	13.5	<0.04				0.38	0.39		
6/22/2007		2.40	2.30	0.34	0.20	0.20				2.50	2.40	0.68	0.26	0.34		
8/31/2007		3.80	2.10	0.33	0.17	0.22				2.50	1.70	0.37	0.21	0.24		
1/22/2008	<0.04	4.27	4.1	0.55	0.22	<0.5 ^c	7.9		<0.04	4.74	4.10	<1 ^c	0.21	<0.5 ^c	7.9	
3/21/2008	<0.04	4.40	0.01	0.27	0.21	0.23	7	3	<0.04				0.21	0.32	7	2
5/15/2008	<0.04	1.50	0.02	0.36	0.16	0.17			<0.04				0.24	0.37		
7/11/2008						0.23								0.33		
7/21/2008															7	13.6
8/12/2008															7.2	6.1
9/22/2008															7.9	4.5
9/25/2008	<0.04	1.85	0.01	0.26	0.14	0.16										
10/16/2008	<0.04	4.74	0.02	1.20	0.21	0.55	7.4	27								
11/12/2008	<0.04	4.07	0.02	0.52	0.22	0.26	7.7	13.4	<0.04	4.29	0.02	0.64	0.23	0.27	7.6	13.6
11/12/2008							7.8	16							8.02	4.3
11/12/2008							7.1	8.3								
12/16/2008	0.10	5.01	0.03	1.57	0.21	0.45	7.5	8.3	<0.04	4.85	0.02	0.88	0.23	0.35	7.73	0.06
12/16/2008							8.07	12								
1/21/2009	<0.04	4.61	0.02	0.83	0.22	0.34	7.6	16	<0.04 ^d	4.82	0.02	0.41	0.24	0.25	7.42	3.9
1/21/2009							7.7	3								
2/17/2009	<0.04	4.34	0.01	0.55	0.206	0.285	7.98	3.6	<0.04	4.66	0.01	0.55	0.210	0.261	6.98	7.8
3/27/2009	<0.04	5.21	0.01	0.30	0.119	0.249	8.02	1.8	<0.04	5.18	0.02	0.55	0.223	0.278	7.62	7.8
4/14/2009	<0.04	1.44	<0.01	0.10	0.078	0.144	7.75	1	<0.04	2.40	0.02	0.53	0.142	0.290	7.9	5.9
5/21/2009	<0.04	1.74	<0.01	0.49	0.099	0.201	7.42	1.1	<0.04	2.79	0.02	0.38	0.155	0.292	7.68	6.4
6/19/2009	<0.04	1.25	0.01	0.43	0.077		7.38	5.1	<0.04	2.07	0.03	0.42	0.172		8.28	1.3
7/25/2009							7.4	5.6							7.8	14
8/14/2009	<0.04	2.46	0.02	0.36	0.155	0.188	7.3	5.4	<0.04	2.44	0.03	0.67	0.201	0.320	8.07	12
9/17/2009				0.30	0.141		7.11	6.8				0.31	0.195		7.7	
10/1/2009	<0.04	1.82	0.02			0.168			<0.04	2.27	0.01			0.207	7.59	1.3
10/13/2009				0.42								0.30				
10/31/2009							8.28	1.3								
10/16/2009					0.225								0.244			
11/10/2009	<0.04	4.09	0.02	0.37	0.211	0.246			<0.04	4.41	0.02	0.42	0.219	0.257	7.59	16
12/2/2009	0.23	3.78	0.02	0.68	0.230	0.350			<0.04	4.37	0.01	0.39	0.250	0.253	7.99	14
1/5/2010	0.07	4.91	0.02	0.67	0.228	0.361			<0.04	6.21	0.02	0.34	0.242	0.284	7.7	16
2/2/2010	<0.04	4.24	0.01	0.38	0.207	0.261	7.46	10	<0.04	4.68	0.01	0.42	0.220	0.256	7.86	10
3/11/2010	<0.04	3.72	0.01	0.43	0.193	0.292	8.3	10	<0.04	4.34	0.01	0.48	0.190	0.255	8.2	9
4/6/2010	<0.04	4.00	0.02	0.24	0.168	0.231			<0.04	3.98	0.02	0.37	0.191	0.234	8.1	9
5/5/2010				0.49	0.100	0.138	7.9	17				0.56	0.162	0.232	7.8	16
6/3/2010	0.07	0.93	0.01	0.34	0.108	0.148	7.83	16	<0.04	1.74	0.03	0.54	0.169	0.240	7.75	15
7/22/2010	0.08	2.15	0.05	0.46	0.151	0.227	7.1	18	0.05	2.45	0.05	0.66	0.165	0.295	7.6	17
8/6/2010	<0.04	2.59	0.06	0.60	0.200	0.278	7.82	18	<0.04	2.64	0.10	0.85	0.191	0.367	7.83	18
Mean	<0.05	3.43	0.31	0.50	0.178	<0.266	7.7	9.9	<0.04	3.65	0.36	<0.53	0.209	<0.288	7.7	9.8
Median	<0.04	4.00	0.02	0.43	0.200	0.239	7.7	10.0	<0.04	4.14	0.02	<0.50	0.210	<0.270	7.7	10.0
Std Dev	0.04	1.342	0.986	0.298	0.051	0.104	0.37	6.84	0.002	1.272	1.025	0.187	0.046	0.064	0.34	5.55

Note^a: Data not required per current NPDES permit.

Note^b: Data not reliable. The Hach bench top temp/pH probe which had been providing inaccurate effluent temperature readings prior to Nov 2009 was also used by lab personal for surface water temperatures.

Note^c: Tests run at Minimum Detection Limits greater than required by current NPDES permit due to laboratory error.

APPENDIX B

Sampling and Analysis Plan

FORSGREN

Associates Inc.

March 24, 2010

John Prigge
Wastewater Manager
Sorrento-Lactalis
4912 E. Franklin Rd.
Nampa, ID 83653

Re: Sampling and Analysis Plan - Drains

Dear John:

In order to better define existing background water quality and water quality impacts associated with Sorrento operations, we propose to initiate a limited surface water sampling plan in the area. We propose to begin sampling within the week to capture data for the permit application prior to irrigation season and continue to collect data through the summer to supplement the permit application data as needed.

Proposed monitoring stations, analytical parameters, and suggested schedule are shown below.

Monitoring Locations

We propose monitoring at four locations in addition to the two locations currently monitored by Sorrento. The locations are shown on the attached figure.

Monitoring Station	Description	Sampling Location
SW-A	Background - Perkins Drain upstream of Land Application (LA)	Perkins Drain downstream of McDermott Rd.
SW-B	Background - Rachael Drain upstream of LA	Rachael Drain downstream of Franklin Dr.
SW-C	Perkins Drain downstream of LA	Perkins Drain approximately 20-ft downstream of Perkins/Rachael confluence
SW-D	Purdam drain downstream of Perkins confluence	Purdam drain approximately 20-ft downstream of Perkins/Rachael confluence.
SW-E (existing)	Purdam Drain upstream of outfall	Perkins Drain upstream of Star Rd. – existing sampling location
SW-F	Effluent outfall	Existing effluent outfall sampling

John Prigge
Wastewater Manager
Sorrento-Lactalis
March 24, 2010

Monitoring Station	Description	Sampling Location
(existing)		location at the wastewater treatment plant (approximate 2,000-ft south of discharge point at Purdam Drain)
SW-G (existing)	Purdam Drain at Mason Creek downstream of outfall (referred to as "mouth of Purdam")	Purdam Drain at Ustick Rd. (south of Ustick Rd. east of Northstart

Monitoring stations A & B will provide background data upgradient of Sorrento's land application area. Monitoring location C will provide data below the convergence of the Perkins and Rachel drains. The difference between background (A & B) and monitoring station C should provide an indication of the impact of groundwater flow through the land application area on the Perkins drain.

$$\text{Groundwater impacts from Sorrento land application area} = C - (A+B)$$

Monitoring station D on the Purdam Drain will provide data downstream of both the effluent outfall and the Perkins Drain. These data, along with the background data (monitoring stations C & E), will help define potential impacts of the effluent outfall on the drain.

$$\text{Sorrento Impacts} = D - (C+E+F)$$

The downstream monitoring station G (Purdam Drain at Mason Creek) should continue to be monitored as required by the NPDES permit. However, because this location is located approximately 4.5 miles downstream of the effluent outfall, many variables could contribute to an increase in phosphorus at that point (e.g., runoff from ag land). Therefore it is not a useful location for isolating Sorrento's impacts.

Parameters

We suggest that the monitoring locations be sampled for the parameters shown in the table below.

Parameter	Analytical Cost- Per sample
Flow	30-60 minutes per location (Forsgren)
Flow meter	\$30/day (Analytical Laboratories, Inc).
Total Phosphorus	\$21 (Analytical Laboratories, Inc)
Ortho Phosphorus	\$17 (Analytical Laboratories, Inc)
Nitrate-N	\$18 (\$25 for Nitrate Low 0.02 mg/l) (Analytical Laboratories, Inc)
Total Dissolved Solids	\$12 (Analytical Laboratories, Inc)

John Prigge
Wastewater Manager
Sorrento-Lactalis
March 24, 2010

Total and ortho-phosphorus are critical parameters for NPDES permitting and nitrate and Total Dissolved Solids (TDS) are important for reuse/land application permitting.

Schedule

In order to monitor flows and water quality prior to irrigation season, we propose sampling each location, with the exception of monitoring point G (Mouth of Mason Cr.), twice prior to irrigation season. The first samples and flow measurements will be taken before the end of March, and then again in early April. The samples taken in April can correspond with the monthly sampling currently performed by Sorrento, with our suggested additional monitoring locations also being sampled. Subsequently, all locations will be sampled for water quality parameters monthly, on the same day, throughout the summer. Flow measurements will be taken twice during the irrigation season.

Work Plan

Forsgren proposes to determine flow at each location not currently measured by Sorrento with a staff gage. We would convey the first two sets of samples to Analytical Labs for analysis. We propose to pay for these first two sets of analyses under our existing authorized scope of work. We suggest that all samples be collected by the same person to promote consistency. Options include Sorrento monitoring the additional points (A-D) in addition to the locations currently monitored (E&G). Or Forsgren could monitor all locations until we have gathered the data necessary for permitting purposes.

Let's chat when you have had an opportunity to consider this proposal. We are pleased to be working with you on this important project.

Thank you.

John R. Moeller, Ph.D.
Forsgren Associates

Enc: Surface Water Monitoring Station Figure



Sorrento Lactalis - Surface Water Monitoring Stations Figure

APPENDIX C
Optional Background Surface Water
Monitoring Results

Sorrento Lactalis, Inc.
Optional Background Surface Water Monitoring Results

Date	Test Performed	Units	Background of Perkins Drain	Background of Rachael Drain	Confluence of Perkins and Rachael Drains	Purdum Drain downstream of confluence	Purdum Drain Upstream of Outfall	Effluent Outfall
			SW-A	SW-B	SW-C	SW-D	SW-E	SW-F
30-Mar-10	Flow	cfs	0.63	2.62	4.21	11.44	6.12	1.06
		mgd	0.41	1.69	2.72	7.39	3.96	0.68
	Nitrate	mg/l	4.9	4.8	3.6	5.3	4.0	4.9
		lb/d	16.6	67.8	81.7	326.8	132.0	27.9
	Ortho Phosphate	mg/l	0.21	0.15	0.17	0.18	0.21	<0.05
		lb/d	0.71	2.12	3.86	11.10	6.93	<0.29
	Total Phosphate	mg/l	0.21	0.19	0.17	0.18	0.25	<0.05
		lb/d	0.71	2.68	3.86	11.10	8.25	<0.29
2-Apr-10	Flow	cfs	0.63	3.54	3.44	12.48	6.12	1.06
		mgd	0.41	2.29	2.22	8.07	3.96	0.69
	Nitrate	mg/l	5.3	3.4	3.5	3.8	3.6	7
		lb/d	18.0	64.9	64.9	255.6	118.8	40.1
	Ortho Phosphate	mg/l	0.2	0.13	0.15	0.17	0.19	<0.05
		lb/d	0.68	2.48	2.78	11.44	6.27	<0.29
	Total Phosphate	mg/l	0.2	0.17	0.16	0.19	0.22	<0.05
		lb/d	0.68	3.24	2.97	12.78	7.26	<0.29
6-May-10	Flow	cfs	0.33	4.56	8.09	26.61	13.77	0.91
		mgd	0.21	2.95	5.23	17.20	8.90	0.59
	Nitrate	mg/l	4.7	1.6	2.4	2.5	1.8	3.2
		lb/d	8.4	39.3	104.7	358.6	133.6	15.7
	Ortho Phosphate	mg/l	0.19	0.07	0.11	0.14	0.09	<0.005
		lb/d	0.34	1.72	4.80	20.08	6.68	<0.025
	Total Phosphate	mg/l	0.2	0.08	0.11	0.16	0.13	0.025
		lb/d	0.36	1.97	4.80	22.95	9.65	0.123
3-Jun-10	Flow	cfs	2.49	9.3	13.48	48.79	50.93	0.79
		mgd	1.61	6.01	8.71	31.53	32.92	0.51
	Nitrate	mg/l	2.2	1.5	2.5	2.2	1.1	2.3
		lb/d	29.5	75.2	181.7	578.6	302.0	9.8
	Ortho Phosphate	mg/l	0.09	0.12	0.13	0.14	0.09	0.005
		lb/d	1.2	6.0	9.4	36.8	24.7	0.021
	Total Phosphate	mg/l	0.07	0.19	0.13	0.17	0.1	0.035
		lb/d	0.9	9.5	9.4	44.7	27.5	0.149
6-Jul-10	Flow*	cfs	3.29	5.74	16.85	53.07	25.01	1.05
		mgd	2.13	3.71	10.89	34.30	16.16	0.68
	Nitrate	mg/l	3.9	2.4	3.7	3	2.1	1.5
		lb/d	52.3	120.3	268.8	789.0	576.5	6.4
	Ortho Phosphate	mg/l	0.27	0.1	0.18	0.19	0.2	0.005
		lb/d	3.6	5.0	13.1	50.0	54.9	0.021
	Total Phosphate	mg/l	0.27	0.11	0.18	0.2	0.16	0.038
		lb/d	3.6	5.5	13.1	52.6	43.9	0.162
Average Concentrations	Total Dissolved Solids	mg/l	220	160	270	248	196	2380
		lb/d	2,953	8,021	19,618	65,222	53,807	10,148
	Nitrate	mg/l	4.20	2.74	3.14	3.36	2.52	3.78
		mg/l	0.19	0.11	0.15	0.16	0.16	<0.02
	Total Phosphate	mg/l	0.19	0.15	0.15	0.18	0.17	<0.04
		mg/l	248	200	266	317	204	2,266

Grey cells represent calculated values

*note: On July 6th groundwater seeping into the canals was evident on the sides of the ditches